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Fire Suppression Systems Association

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September 3, 2002

Elaine E. Joost
Acting Administrator
Research and Special Programs Administration
U.S. Department of Transportation
400 7th Street, SW
Washington, DC 20590-0001

Re: Petition for Reconsideration - HM-220D - Requirements for Maintenance, Requalification, Repair, and Use of DOT Specification Cylinders – Final Rules.
Docket No. RSPA-01-10373 – 5

Dear Ms. Joost,

This petition is being submitted by the Fire Suppression Systems Association in response to the recently published DOT HM-220D Final Rule that appeared in the August 8, 2002 issue of the Federal Register/Vol. 67, No. 153. Its purpose is to highlight sections of HM-220D Final Rule that will adversely impact the fire protection industry and its products. Three (3) copies of this petition are being submitted for your use.

I. Background

The Fire Suppression Systems Association ("FSSA") is a national trade association whose members include the manufacturers and contracting installers of special hazard fire protection systems. FSSA members also include the suppliers of fire extinguishing agents, detection equipment and other components used to make up a special hazard fire suppression system.

Fire suppression systems provide critical fire protection to such high hazard or high value facilities as:

- National defense systems, commercial and military aviation,
- Telecommunications systems, data processing and storage installations,
- Petrochemical facilities and energy pipelines,

- Explosion hazards,
- Power generation, transmission and control, and
- Irreplaceable art objects and documents (our Bill of Rights at the National Archives, the Smithsonian Institute, Mount Vernon, etc.)

The majority of these systems use high pressure and low pressure DOT containers for storage of various types of fire extinguishants, such as CO_2, Halon 1301, halocarbon clean agents, nitrogen, mixtures of atmospheric inert gas clean agents, and dry and wet chemical agents.

Many FSSA member companies are directly involved in the design, manufacture, testing, packaging, shipment, installation, maintenance, and requalification of DOT fire suppression system cylinders; along with the design and servicing of the valves and pressure relief devices specified for use with the cylinders and extinguishing agents used.

In addition to complying with DOT-49CFR and CGA pamphlet S-1.1 (Pressure Relief Device Standards for Compressed Gas Cylinders), fire protection systems and associated equipment (such as cylinders, valves, PRD's, etc.) are required to be tested, listed and/or approved by nationally recognized independent third party agencies, such as Underwriters Laboratories (UL), and Factory Mutual Research Corp. (FMRC). Consequently, any changes to the Listed and Approved equipment necessitates that these items be resubmitted to the third party agencies for review and possible retest which can take up to two years or longer.

II. FSSA Position and Request for Relief

FSSA is submitting its Petition for Reconsideration on the following sections of the final rule: 173.301(f)(2), 173.301(f)(3) and 177.840(a)(1). FSSA has serious concerns about the new requirements stated in these sections. **Without relief, we believe these sections would in effect halt all future production of special hazard fire suppression cylinders - - therefore halting future use of a critical tool to protect life, property and the environment from fire. The sections would also ban the transport of existing cylinders, which is often necessary to install and service a fire suppression system.**

FSSA respectfully requests DOT to delay the October 1, 2002 effective date for sections 173.301(f)(2), 173.301(f)(3) and 177.840(a)(1) until the Agency has had a sufficient opportunity to consider the industry petitions and the specific, real concerns expressed therein.

III. Comments

We believe that several of the new HM-220D requirements extend product compliance well beyond the currently established and proven successful measures already in place. In addition to complying with DOT-49CFR, CGA pamphlet S-1.1, and other international standards, our products are also required to be tested and listed by nationally recognized independent third party agencies such as Underwriters Laboratories and FMRC. Therefore, it is required that any of our members' equipment which has undergone any kind of alteration, as will be required by the final rule, must be resubmitted for review and testing by each of these agencies. Due to these agency requirements it would be impossible for all the required design development to occur, and for the

applicable agencies to assess and approve these changes by the proposed deadline of October 1, 2002.

The following addresses our specific concerns and defines the impact to our business of the applicable sections of DOT HM-220D.

IV. Deferred Compliance Date Requested

If the new regulations are implemented as scheduled, many of our members' current fire suppression cylinder/valve assemblies will be in violation of the new DOT HM-220D regulations after October 1, 2002. In order to be in compliance with the new regulations as written, it is conceivable that all shipments of these products would have to cease. This approach would have a significant impact on the availability of these critical life safety and equipment protection products.

We request that an exception be made for the referenced sections, 173.301(f)(2), 173.301(f)(3), and 177.840(a)(1), to delay the compliance date appropriately, until the DOT has had sufficient opportunity to review the industry petitions and address our specific concerns outlined below. It is impossible for the fire suppression industry to comply with these sections of the final rule by October 1, 2002.

V. Section 173.301 – *General requirements for shipment of compressed gases in cylinders and spherical pressure vessels.*

- **173.301(f)(2)** – When a pressure relief device is installed, the inlet port to the relief channel must be in the vapor space of the cylinder.

Impact: This new regulation has significant consequences for our members. The current configuration of many containers locates the inlet port to the pressure relief device in the *siphon tube*, which communicates directly with the liquid portion of the contents, rather than the cylinder vapor space. For some products, it may be possible to move the PRD location from the valve to a welded fitting on the top of the cylinder itself. In other cases, this option is simply not available. Also, due to the short discharge time requirements for successful fire suppression, agent flow rates are extremely high out of the cylinders. In order for this to occur, relatively large siphon tubes must be used to rapidly discharge the liquid portion of the extinguishing agents. Valves are generally designed to maximize the internal diameter relative to the external diameter. Therefore, there does not exist sufficient clearance to port the PRD directly into the vapor space of the cylinder and still meet the orifice sizing requirements defined by CGA S-1.1. Consequently, potentially extensive design changes to multiple valves would be necessary. These changes cannot be implemented in time for the October 1, 2002 compliance deadline and, in our opinion, are not justified.

Additionally, this paragraph raises concerns regarding the shipment of some specialized containers, namely spheres and bottom discharge cylinders. The configuration of these containers places the PRD at the bottom of the container, exposing them exclusively to the liquid portion. In order to comply with this particular regulation, these vessels would have to be shipped in an inverted position, raising many new, and likely more daunting, safety concerns.

Upside-down shipping introduces **serious personal safety concerns** for the loading and unloading of bottom discharge cylinders. Presently, spheres and bottom discharge cylinders are shipped with the mounting flanges, brackets, or foot rings securely planted on the ground (pallet), where the potential for tipping of the unit is minimized. Shipping these units upside-down would significantly increase this risk. Short of inverted shipping, costly and extensive redesigns of the PRD systems for both vessel types would be necessary; a change that is not justified.

In 1978-1979, several FSSA member companies participated in a series of fire tests conducted by the CGA Pressure Relief Committee. These fire tests were conducted for DOT at the Bureau of Explosives facility in Edison, New Jersey in order to re-validate the flow equations in CGA pamphlet S-1.1. These fire tests proved that, when sized according to the minimum requirements set forth by CGA S-1.1, a PRD would safely relieve the contents of pressurized cylinders, *regardless of whether the PRD was ported into the liquid or vapor space of a cylinder.* Copies of the test results were supplied to DOT at that time. We hope that DOT will review these test data and continue to allow the design of pressure relief devices per CGA S-1.1.

Moreover, we feel the referenced paragraph is in direct conflict with the intent of CGA S-1.1, 1994 paragraph 5.1.1.1, which reads:

> *When used with liquefied flammable ladings, pressure relief devices and valves shall be in direct contact (communication) with the vapor space of the cylinder when in normal use. 'Normal Use' is defined as the position of the cylinder during withdrawal of its contents.*

We understand the intent of this paragraph is to restrict the potential for the burning of flammable liquid, as opposed to vapor, in the event of a pressure relief device operating due to, or in the vicinity of, fire conditions.

To our knowledge, there are no technical or safety issues that justify requiring *all* PRDs to be ported into the vapor space of the cylinders. Accordingly, we strongly recommend that section 173.301(f)(2) be deleted, since it is already appropriately addressed in CGA S-1.1, or at the very least be modified to exclude Division 2.2 (non-flammable compressed) gases.

- **173.301(f)(3)** – For a DOT3, 3A, 3AA, 3AL, 3AX, 3AAX, 3B, or 3BN cylinder, from the first requalification due on and after October 1, 2002, the set pressure of the pressure relief device must be at test pressure with a tolerance of plus zero to minus 10%.

Impact: This switch to a pressure range of plus zero to minus 10% of the test pressure of the cylinder for pressure relief will tighten up the tolerance on cylinder burst disks significantly. The logistics of the implementation time for such a large assortment of burst disks will extend beyond the required conformity date of October 1, 2002.

We wish to point out further, that for rupture disk devices, the operating tolerance for the complete PRD assembly (including the disk and disk holder) is plus zero to minus 15%. This is detailed in section 6.3 of CGA pamphlet S-1.1, 1994 edition. Since S-1.1 is referenced in 171.7 of 49 CFR it is part of the DOT regulations that the FSSA members have been complying with.

Additionally, we feel that this new requirement is in direct conflict with the intent of CGA S-1.1, 1994 paragraph 4.2.1.4, which reads:

> *Rupture disk device settings authorized for low pressure cylinders for a particular gas, may be used on higher pressure cylinders for the same gas; provided that the product fill density and pressurization level are the same as specified for the low pressure cylinder.*

This paragraph allows for the use of cylinders with pressure ratings higher than that required for a given extinguishing agent. In some cases, it is convenient and more cost effective for a manufacturer to use a cylinder with a rated test pressure higher than necessary for the product. In these instances, it should not be a requirement for the pressure relief device to be sized to the cylinder; rather, for safety reasons it should be sized to the service pressure of the gas contained within. This is the original intent of this paragraph, and we feel it is still a valid position.

In further support of our position, we would like to reference the Federal Register docket, dated Thursday, August 8, 2002, section IV. A., paragraph 2 on page 51637:

> *Further, this final rule [HM-220D] will improve cylinder transportation safety by reducing the number of unintentional releases of flammable and toxic material from DOT-3 series cylinders.*

This paragraph, as we read it, supports the position that DOT's intent in this new regulation is in fact to increase the safety of transporting *flammable* and *toxic materials*. Given the excellent transportation safety record the fire protection industry shares, and that the gases we ship are both non-flammable and non-toxic, we strongly recommend an exemption be included in DOT-49CFR paragraph 173.301(f)(3) to exclude Division 2.2 (non-flammable compressed) gases.

VI. Section 177.840 – *[CARRIAGE BY PUBLIC HIGHWAY] – Class 2 (gases) materials*

- **177.840(a)(1)** ***Cylinders*** – Cylinders containing Class 2 (gases) materials must be securely restrained in an upright position, loaded in racks, or packed in boxes and crates and securely attached to the motor vehicle to prevent the cylinders from being shifted, overturned, or ejected from the vehicle under normal transportation conditions. A cylinder containing a Class 2 material may be loaded in a horizontal position when the cylinder is designed so that the inlet port to the relief channel of the pressure relief device is located in the vapor space of the cylinder.

Impact: This requirement, coupled with the wording of DOT-49CFR paragraph 173.301(f)(2), will have a major impact on many of our members current shipping techniques and product designs. If an exception to this rule is not made for Division 2.2 gases, an extensive and costly redesign of spherical and bottom discharge cylinders would be the only remaining option, an option that cannot be done by October 1, 2002.

Additionally, many products intended for vertical use are presently shipped on their sides. Virtually all of CO_2 cylinders, FE-13 cylinders, and some FM-200 cylinders are stacked, banded,

and shipped horizontally for safety reasons. The addition of this requirement would require numerous changes to internal shipping procedures and necessitate costly alterations to both our manufacturing and shipping facilities, possibly compromising safety.

We wish to point out again that the CGA fire tests conducted for DOT in the late 1970's showed, that when sized in accordance with CGA pamphlet S-1.1, *the PRD's safely relieved the contents of the cylinders, regardless of whether the PRD's were ported into the liquid or vapor space of the cylinder.*

In our experience, there are no safety issues involved with the fire extinguishing agents that justify requiring the PRDs to be ported into the vapor space of the cylinders when shipped (loaded) in a horizontal position. Accordingly, we strongly recommend DOT-49CFR paragraph 177.840(a)(1) be modified to exclude Division 2.2 (non-flammable compressed) gases from this requirement.

VII. Conclusion

We appreciate your thoughtful review of our concerns. FSSA would be available to facilitate an industry discussion with DOT personnel to review this technical information. FSSA has a genuine concern for safety that parallels DOT's concern. We look forward to a favorable decision on our Petition so that a discussion can take place and improvements to the final rule can be developed.

Respectfully submitted,

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Executive Director

Charles F. Willms, PE
Technical Director